

007728 P01 USA/DSM/IBSS/LAP
Application No: 10/825,831
Page 8 of 11

REMARKS

Upon entry of this amendment, claims 1, 3-11, 13-15, and 17-20 will be pending in the application, of which claims 1, 3, 4, 7, 9-11, 13-15 and 17-20 are being amended, and claims 2, 12, and 16 are being canceled.

The claim amendments are fully supported by the originally filed specification and original claims and add no new matter. Accordingly, entry of the amendments and reconsideration of the present case is respectfully requested.

Rejection Under 35 U.S.C. § 103(a)

The Examiner rejected claims 1-20 under 35 U.S.C. § 103(a) as being unpatentable over McMillin; Brian et al. (US 6,013,155 A) in view of Rohrberg; Roderick (US 3,604,889 A).

Claims 1 and 3-8

Amended claim 1 recites, inter alia, a longitudinal ceramic body having a channel to direct the flow of the gas into the chamber, the ceramic body comprising a first external thread to mate with the gas distributor ring, a second external thread to receive a heat shield, the channel comprising an inlet to receive the gas from the gas distributor ring, and a pinhole outlet at the end of the channel to release the gas into the chamber, wherein the pinhole outlet has a diameter d_o , and wherein the distance d_{st} between the second external thread and the pinhole outlet is about $90d_o$ to about $140d_o$.

U.S. Patent No. 6,013,155 (hereinafter "McMillin et al.") does not teach or suggest amended claim 1 when taken as a whole. As stated by the Examiner, "McMillin does not teach a second external thread to receive a heat shield. McMillin does not teach ceramic body (180; Figure 1) comprising a first external thread to mate with the

007728 P01 USA/DSM/IBSS/LAP
Application No: 10/825,831
Page 7 of 11

gas distributor ring...McMillin further does not teach: i. McMillin's nozzle (180; Figure 1; column 6; line 66 – column 7, line 18) according to claim 1 wherein the pinhole outlet has a diameter d_o , and wherein the distance d_{st} between the second external thread and the pinhole outlet is about $90d_o$ to about $140d_o$..." (Office Action mailed 9/14/2005, p. 3.)

U.S. Patent No. 3,604,889 (hereinafter "Rohrberg") fails to make up for the deficiencies of McMillin et al.. Rohrberg does not teach that the distance d_{st} between the second external thread and the pinhole outlet is about $90d_o$ to about $140d_o$, as recited in amended claim 1. Instead, Rohrberg teaches "A gas cup 22, which may also be of conventional design known to the prior art, is secured to holder 20 by appropriate means which may take the form of helical screw threads on both items 20 and 22 as shown by threads 24 in FIG. 1." (Rohrberg, Col. 3, lines 51-54.) Rohrberg does not teach or suggest a distance from a helical screw thread to an inlet. With respect to amended claim 1, the distance d_{st} is selected to avoid adversely impacting the gas flow characteristics of the gas flowing from the pinhole outlet. For example, the pinhole outlet diameter d_o is selected to provide a pressurized flow of gas exiting the nozzle into the chamber so that the presence of the second threaded connection (to receive a heat shield) does not adversely effect the fluid dynamics of the gas flow into the chamber. For instance, a heat shield structure when attached to the second threaded connection which is behind the pinhole outlet may change the pressure gradient of gas external to the nozzle in the spatial region from the pinhole outlet to the second external thread, which in turn, can affect the gas flow characteristics from the pinhole outlet. Thus, the claimed distance d_{st} is selected to provide a sufficient separation distance between the pinhole outlet and the second external thread to avoid adverse effects of the second external thread on the pinhole outlet. As claimed, the distance d_{st} is selected to be from about 90 to about 140 times d_o .

Therefore, amended claim 1 is patentable over McMillin et al. in view of Rohrberg. Dependent claims 3-8 depend on amended independent claim 1. Thus,

007728 P01 USA/DSM/IBSS/LAP
Application No: 10/825,831
Page 8 of 11

dependent claims 3-8 are patentable over the cited references for the same reasons presented for independent claim 1.

Claims 9-11 and 13-14

Claim 9 as amended recites, inter alia, a hollow member configured to be coupled with the nozzle and having an internal dimension sufficiently large to be disposed around at least a portion of the nozzle, the hollow member having an extension which projects distally of the nozzle outlet and which includes a heat shield opening for the process gas to flow therethrough from the nozzle outlet, the extension of the heat shield is sized to project distally of the nozzle outlet by a distance of between about a radius of the nozzle and about a diameter of the nozzle.

As per the Examiner, "McMillin further does not teach: x. 'heat shield...wherein the extension of the heat shield is sized to project distally of McMillin's nozzle (180; Figure 1; column 6; line 66 – column 7, line 18) outlet by a distance of between about a radius of McMillin's nozzle (180; Figure 1; column 6; line 66 – column 7, line 18) and about a diameter of McMillin's nozzle (180; Figure 1; column 6; line 66 – column 7, line 18)'..." (Office Action mailed 9/14/2005, p. 5.)

Rohrberg fails to make up for the deficiencies of McMillin et al.. Rohrberg does not teach that the extension of the heat shield is sized to project distally of the nozzle outlet by a distance of between about a radius of the nozzle and about a diameter of the nozzle, as in amended claim 9. Rohrberg teaches "A gas cup 22, which may also be of conventional design known to the prior art, is secured to holder 20 by appropriate means which may take the form of helical screw threads on both items 20 and 22 as shown by threads 24 in FIG. 1." (Rohrberg, Col. 3, lines 51-54.) Rohrberg does not mention a specific distance from the heat shield and the nozzle. It is advantageous to have a heat shield which is sized to project distally of the nozzle outlet by a distance of between about a radius of the nozzle and about a diameter of the nozzle because the distance should be sufficiently large to shield the distal end of the

007728 P01 USA/DSM/IBSS/LAP
Application No: 10/825,831
Page 9 of 11

nozzle from the heat in the chamber though not so large as to have an adverse effect on the process being performed.

Therefore, amended claim 8 is patentable over McMillin et al. in view of Rohrberg. Dependent claims 10-11 and 13-14 depend on amended independent claim 9. Thus, dependent claims 10-11 and 13-14 are patentable over the cited references for the same reasons presented for independent claim 9.

Claims 15 and 17-20

Amended claim 15 recites, inter alia, a longitudinal ceramic body having a channel to direct the flow of the gas into the chamber, the ceramic body comprising a first external thread to mate with the gas distributor ring, a second external thread to receive a heat shield, the channel comprising an inlet to receive the gas from the gas distributor ring, and a pinhole outlet at the end of the channel to release the gas into the chamber, the pinhole outlet has a diameter d_o , and wherein the distance d_{st} between the second external thread and the pinhole outlet is about $90d_o$ to about $140d_o$.

As stated by the Examiner, "McMillin further does not teach: xiii. the shielded gas nozzle (180; Figure 1; column 6; line 66 – column 7, line 18) for a substrate processing chamber (140; Figure 1; column 6; lines 44-65) comprising (a) a longitudinal ceramic body (180; Figures 12a,b; 13a,b) having a channel (conduit not labelled [sic]; Figures 12a,b; 13a,b) to direct the flow of the gas into the chamber (140; Figure 1; column 6; lines 44-65), the ceramic body (180; Figure 1) comprising a first external thread to mate with the gas distributor ring (170; Figure 2a,b; column 6; line 66 – column 7, line 18); a second external thread to receive a heat shield, the channel (conduit not labelled [sic]; Figures 12a,b; 13a,b) comprising an inlet to receive the gas from the gas distributor ring (170; Figure 2a,b; column 6; line 66 – column 7, line 18), and a pinhole outlet at the end of the channel (conduit not labelled [sic]; Figures 12a,b; 13a,b) to release the gas into the chamber (140; Figure 1; column 6; lines 44-65). (b) a hollow member configured to be coupled with the ceramic body (180; Figure 1) and

007728 P01 USA/DSM/IBSS/LAP
Application No: 10/825,831
Page 10 of 11

having an internal dimension sufficiently large to be disposed around at least a portion of the ceramic body (180; Figure 1), the hollow member having an extension which projects distally of the pinhole outlet and which includes a heat shield opening for the process gas to flow therethrough from the pinhole outlet'..." (Office Action mailed 9/14/2005, p. 6.)

Rohrberg fails to make up for the deficiencies of McMillin et al.. Rohrberg does not teach that the distance d_{st} between the second external thread and the pinhole outlet is about $90d_o$ to about $140d_o$, as recited in amended claim 15. Rohrberg teaches "A gas cup 22, which may also be of conventional design known to the prior art, is secured to holder 20 by appropriate means which may take the form of helical screw threads on both items 20 and 22 as shown by threads 24 in FIG. 1." (Rohrberg, Col. 3, lines 51-54.) Rohrberg does not mention a specific distance or range of distance from a helical screw thread to an inlet. With respect to amended claim 15, the distance d_{st} is selected to avoid impacting the characteristics of the flow of gas from the pinhole outlet by providing separation between the pinhole outlet and the second external thread to avoid adverse effects of the second external thread on the pinhole outlet, the distance d_{st} being selected to be from about 90 to about 140 times d_o .

Therefore, amended claim 15 is patentable over McMillin et al. In view of Rohrberg. Dependent claims 17-20 depend on amended independent claim 15. Thus, dependent claims 17-20 are patentable over the cited references for the same reasons presented for independent claim 15.

007728 P01 USA/DSM/IBSS/LAP
Application No: 10/825,831
Page 11 of 11

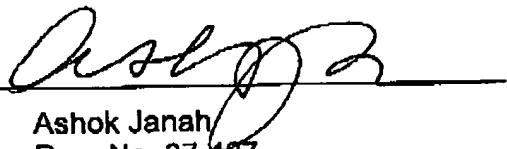
CONCLUSION

The above-discussed amendments are believed to place the present application in condition for allowance. Should the Examiner have any questions regarding the above remarks, the Examiner is requested to telephone Applicant's representative at the number listed below.

Respectfully submitted,
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Date: March 14, 2006

By: _____


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